Webinar

Welcome, and thank you for standing by. Today's conference is being recorded. If you have any objections, you may disconnect at this time. All participants are in a listen-only mode until the question-and-answer session of the conference. At that time, if you would like to ask a question, please press star and then one. I am turning the call over to your host Mr. Ken Whang. You may begin.

Thank you. Welcome to this webinar for proposers introducing the new NSF program that we call Understanding Neural and Cognitive Systems, or NSF-NCS. This program currently involves four different directorates at NSF. My name is Ken Whang of the Directorate for Computer and Information Science and Engineering. You cannot see us all on the webinar, but I'm here in the room with my colleagues on the program officer team representing all of the participating directorates, which also include Education and Human Resources, Engineering, and Social, Behavioral, and Economic Sciences.

Our goals today are to give you a sense of this new program's scope and context, the research themes and proposal classes, information about how to apply, and how to decide whether or not this is the right program for you.

And to answer any questions which you can send to us by email as we go along at ncs@nsf.gov.

This is a new program that we have put out, but it is only one of several activities related to the President's BRAIN Initiative and our multi-year effort on Cognitive Science and Neuroscience. The nsf.gov/brain website has more information about funding opportunities related to this broader effort (you can click on the "funding" tab) as well as information about workshops and other events that are helping to shape our agenda.

Some of these opportunities may be a good match for projects that you would like to seek funding for, possibly in addition to or instead of the NCS solicitation. I encourage you to take a closer look.

The emphasis of the new solicitation is on transformative integrative approaches that can bridge across temporal or spatial scales, levels of abstraction, levels of analysis, or disciplinary or methodological approaches. **This is not business as usual.** We are looking for bold, potentially risky approaches to tackle previously intractable challenges. This may or may not exactly fit a project that you already have on the drawing board, but we hope it can help you realize something that you have always wanted to do but went beyond the scope of existing NSF programs. I want to note that this is the first phase of a program that we expect to develop and change over time, so stay tuned.

Let me start with what may be the most important thing I tell you today. Please read the solicitation at nsf.gov/ncs, as well as NSF general guidelines. We are not going to tell you anything today that isn't already in those documents, and those are the documents that reviewers will read, and by which your proposals will be judged.

You can think of today's webinar as a guided tour, but not as a substitute for those documents. Note that the NSF Grant Proposal Guide has recently been revised, and the newest version, NSF 15-1, will be in effect. Especially if you don't have a lot of recent experience with NSF, please take some time to go through the guidance on proposal preparation. If nothing else, please see the page on significant changes and search through the Grant Proposal Guide text for "Broader Impacts of the Proposed Work".

When you dig into the solicitation, the first word you will see is "integrative". You will see that word coming up again and again in how we describe the program goals, the proposal classes, the proposal preparation instructions, and the review criteria. We hope you will see that we have used this word for a reason: that the research themes and the funding mechanisms are all organized around foci where we see potential for integration, and mechanisms to stimulate and support integrative scientific strategies.

In that spirit, we are looking, in all of the proposals, for significantly new, integrative strategies that will have impact and go beyond what we can do in our existing programs. Every proposal to this solicitation needs to address explicitly how the proposed work is going to push the envelope of what is possible; advance literature, knowledge, and technologies; and as appropriate, challenge existing paradigms.

Every proposal to this program also needs to address how it is going to cut across scales, levels of abstraction, levels of analysis, or disciplinary or methodological approaches. We welcome approaches that entail significant risk in the pursuit of groundbreaking science. We want you to articulate explicitly what you understand of the risks, feasibility, contingencies… and what the full payoffs could be: transformative impacts within and across fields, what is going to be enabled intellectually or technologically, and other potential impacts.

The current solicitation is organized around two research themes: "Neuroengineering and Brain-Inspired Concepts and Designs" and "Individuality and Variation"; and two proposal classes: INTEGRATIVE FOUNDATIONS and CORE+ EXTENSIONS. I'll say a little bit about each of these, as well as additional future activities that are anticipated because, as I mentioned, this is only the first phase of the new program.

First, the research themes. "Neuroengineering and Brain-Inspired Concepts and Designs" is capitalizing on the confluence of new insights that are coming out of neuroscience and cognitive science on the one hand, and from a range of rapidly developing technology disciplines on the other. The integration across these areas is leading to significant innovations inspired by the brain, or directed toward the brain. These include technologies for imaging, sensing, recording, or affecting real-time brain activity and behavior; computing paradigms; brain-computer interfaces; augmented and adaptive systems; and other computational and bioengineered systems.

The other research theme, "Individuality and Variation," covers neural and cognitive processes at all scales, considering signals, representations, learning, development, individual, cultural, and group processes, and so forth. What are functionally important aspects of individuality and variation? What is the role of noise? Alongside many domain-specific issues, what are some of the domain-general statistical and modeling challenges? How do we explore, describe, and come to understand the role of naturally occurring variability?

Within each of these schematic areas, we're interested in general advances in theory and methods, technological innovations, educational approaches, enabling research infrastructure, and workforce development. These are the two active research themes for the 2015 competition.

We have also announced two anticipated future research themes. These are not active yet in the current competition, but we want you to be aware of them to help you make rational plans. These anticipated future themes, subject to availability of funds, are "Cognitive and Neural Processes in Realistic, Complex Environments" and "Data-Intensive Neuroscience and Cognitive Science."

We have also sketched out three different classes of proposals, two of which are active in 2015. INTEGRATIVE FOUNDATIONS is the main opportunity for this year, for proposals that are submitted directly to this solicitation. These are proposals to develop foundational advances that are deeply connected to a broad scope of important research questions in cognitive and neural systems. In addition to describing the immediate outputs of your research program, you need to articulate how you will be contributing to and interacting within a broader intellectual space. This is another important integrative aspect of your project.

There needs to be significant potential for transformative advances in one or more of the current thematic areas, and you need to be bringing together a collaboration of at least two investigators with distinct but complementary expertise. These projects are expected to range between a half-million dollars to $1 million over 2 to 4 years and you should see the solicitation in section V for specific instructions on how to apply.

I have to emphasize, since they are due just one week from today, that you must submit a Letter of Intent. The Letters of Intent are due in FastLane on December 10. They must include all of the basic information on: who is involved in your proposal; what the project is going to be about, in a way that conveys the major innovation and the integration of the project, with enough detail for us to start identifying reviewers; what theme or themes are being addressed; which participating directorate or directorates it is relevant to; why this doesn't fit an existing NSF core program; and finally, a little bit about the distinct areas of expertise, approaches, or disciplines that you are bringing together, and a brief explanation that backs that up.

The other kind of funding request that we have available this year is called a CORE+ EXTENSION. This is something new and bears some explanation. We see a lot of new ideas coming into the other programs within our directorates that have potential to connect to significant new integrative opportunities in cognitive and neural systems. The CORE+ EXTENSION is a general opportunity for a modest amount of additional funding to make those connections happen, by way of a request that you make in the form of a supplementary document that you send in along with your proposal to another primary program. You might want to connect a project to a new domain or application area, or a distinctly different scale or level of analysis, or add a new international dimension that is synergistic and integrative. These CORE+ EXTENSIONS can be for up to $100,000 in additional funding, for proposals that are recommended for award based on reviews by the primary programs. Please see the solicitation for further instructions. Again, this funding is available for proposals going to any of the other programs in our directorates.

Submit them according to the dates and requirements of the primary program. Don't submit a Letter of Intent for this.

In addition to these two proposal classes that are available in 2015, we are anticipating offering larger awards in future years for more ambitious projects involving three or more investigators over a more sustained period. Again, this is subject to availability of funds and is not available in 2015, but we want you to have some idea of what might lie ahead so you can plan for the most appropriate opportunity.

All of the program goals that we've been talking about get incorporated into the review process via the merit review criteria that are described in section six of the solicitation. As with all NSF reviews, the reviewers will be evaluating your proposal's Intellectual Merit and Broader Impacts. In addition, they will be assessing all of the other aspects of Integrative Added Value and Transformative Potential that we have discussed: whether you are making meaningful connections across scales, levels of abstraction analysis, or approaches; the depth and synergy and complementarity of the collaboration; significant advances with respect to the research themes; whether it's really pushing the envelope: bold, risky, going beyond typical disciplinary approaches; and also guided by a compelling integrative vision, and building on the state of the art of what we already know, and a sound interdisciplinary collaboration.

Will this lead to general theoretical or methodological advances, or technological innovations? Or high-quality resources that the broader research community can use? Does it provide unique collaborative research opportunities for students and early-career researchers? How will it contribute to developing an interdisciplinary workforce in these areas? Not all of these considerations will necessarily apply to every proposal, depending on the proposed activities and the proposal class, but these are the kinds of issues that will be looked at in evaluation and prioritization for funding.

Going back to our original question, is this the right opportunity for you? We hope we've given you background that you can use to ask yourself whether this is a good fit: if it's innovative and integrative as appropriate for this solicitation; whether you're going to significantly advance the research themes; whether you could go to another existing program instead, or if you have something integrative in a way that goes beyond what could be supported by disciplinary programs; and whether you are bringing together the type of collaboration that is needed for this opportunity. Finally, we want to be sure to note that you can participate in only one proposal at most, that your proposal needs to be consistent with the missions of the participating directorates, and to remind you that we are looking for high-risk, high-reward proposals and we want you to explicitly address that.

With that, we will move to the question period. Thanks again for tuning in. Please submit your questions through email. We're going to be reading the questions that come in and answering them to the best of our ability.

Questions

We've had a couple of questions on whether the slides be posted?

Yes, they will, along with the transcript.

With INTEGRATIVE FOUNDATIONS, do you allow multiple site collaborative projects that involve different institutions?

Yes, absolutely. They can be from different institutions or from the same institution, and we have no preference either way. Just describe the intellectual value of the collaboration.

Do these proposals need to focus exclusively on understanding the brain or can they involve the development of brain inspired technology and engineering?

Brain inspired technology and engineering is definitely within the scope, and one of the themes is very much about that.

Can you clarify what makes something not suitable for the existing or standing programs?

This is a good question. All of our existing disciplinary programs do have some openness to interdisciplinary activities, and they do all stretch beyond what one might think of as the core of a discipline. That said, if you look through the types of awards that have been made in particular programs, you can see whether or not your proposed activity seems to fit within that space or not. If you are looking to do something that really goes beyond what would ordinarily be supported in a disciplinary program, that would be the kind of proposal that would be more appropriate for the solicitation.

We have a question about the CORE+ EXTENSION. Does that apply only to new proposals, or can recently funded proposals also include a request for that?

That is a good question. In the current competition, it applies only to new proposals even though the extension is somewhat supplement-like in nature. For simplicity, in 2015 we're accepting these only as a part of a new proposal.

How will you decide whether the areas of expertise of the PIs are distinct enough to qualify for the solicitation?

Sometimes the areas of expertise can be a little bit in the eye of the beholder. You need to make a case for whether it is from different disciplinary trainings, different places where you publish, different communities that you interact with, etc. I think it is worth thinking in terms of not only whether you think of yourself as being distinctly different from your collaborator, but whether somebody in quite a different discipline would think of you as nearest neighbors or as bringing something quite fundamentally different to a project.

What if the indicated approach that you're using involves research that would fall under the umbrella of the Biology Directorate or other nonparticipating directorates at NSF?

The critical thing here is that the nature of the intellectual advance in your project has to be relevant to the mission of at least one of the participating directorates. It doesn't mean that it can't also be potentially relevant to some of the nonparticipating directorates, but given the limitations of which directorates were able to participate in the program, we have funds that are really coming out from the various directorate pots. We're looking for advances that are relevant to the participating directorates, but they could also be relevant to other areas as well.

Is it advantageous for projects to address more than one of the core themes?

I wouldn't say that it is advantageous or not. We're likely going to have a lot of different topical areas within each of these thematic areas, and we will have some proposal areas that naturally have some relevance to both, but there is no advantage specifically to addressing more than one theme as opposed to only one theme.

Can an institution submit more than one proposal?

Yes. There is no limitation based on institution.

Are for-profit organizations eligible to apply?

You should take a look at the general guidelines in the Grant Proposal Guide for organizations that are eligible to apply. For-profit entities are eligible, but check the grant proposal guidelines for some background on that.

I think we can give some clearer vision for people who are not familiar with Letters of Intent. There's a question about what the result of the Letter of Intent will be and what will be available to PIs.

The Letters of Intent are a way for you to communicate to us so that we can have enough information that we can plan the review and prepare for the review. You will not be getting any feedback on the Letters of Intent. It is not the sort of thing where we will be evaluating the Letters of Intent and then saying that you can or cannot submit. It is only a requirement that you do give us this information in advance. The Letters of Intent are also designed to give you a little bit of a self-diagnostic with some of the questions that are asked in terms of appropriateness for the solicitation.

We have a question about what to do if a project does not actually fit within any of the NSF core or existing programs.

If it doesn't fit within any of the core or existing programs… I'm not sure I quite understand the nature of the question. If it doesn't fit one of the core programs or address the research themes then you may need to look for another opportunity. The other thing that you can do is talk to the program officers who are responsible for the nearest neighbors, the core programs that seem to be the closest fit. Those program officers may be able to give you guidance on how to submit an interdisciplinary proposal that would fall somewhere in between our existing core programs.

Can you talk a little bit about what the review process is going to be and, in particular, whether the panel will have appropriate multidisciplinary expertise to evaluate the range of topics?

That is a great question. The review panels are going to be based on what we learn about the proposals coming in through your Letters of Intent. As you can see, we expect to see a wide range of approaches encompassing the four participating directorates and potentially more, and you can expect the review expertise around the table to reflect a pretty broad mix of approaches and perspectives. This is something to keep in mind when you are developing your proposal. You want to make sure on the one hand that the big idea is going to be very clear to people who are reading it from potentially very different perspectives but also that it is "holding water" in that, for many of those perspectives around the review table, that they will be able to get the details that they need to be able to properly evaluate what you are doing. Keep that in mind as you are developing the proposals. We expect that the review panels will be organized into topical clusters, but those clusters might end up being pretty broad in terms of the range of different approaches that will be considered by any given panel.

Will the different themes be reviewed separately using non-overlapping review panels, or will they be reviewed together?

This really depends on the range of topics. We anticipate that some of the topics that people will propose will be relevant to more than one theme, and in that sense they will be reviewed together. I think the best way to think about it is that even though we have organized this into specific thematic

areas to foster integration across those areas, think of it as a unified process where the proposals are all coming into the same process, and we'll be dividing them up according to scientific topics.

Would a combination of behavioral and neuroscience methods, such as imaging, sufficiently capture the interdisciplinary aspect or the solicitation?

I guess you could ask yourself whether this particular combination of technological approaches and behavior is already fairly well covered in an existing area of cognitive neuroscience, or if this is something that is really stretching beyond what we would think of as being a disciplinary approach. It's really going to depend on the details of course, because somebody can be combining two things in a very unconventional way, for example. For questions like that, you should contact us with more detailed information, and we will do our best to address specific situations.

If there is a large team of investigators, for example eight or ten, is it best to apply now or wait for the solicitation for larger projects?

That is a good question. You do need to propose a project that is going to be realistic for the scope of the current mechanism, and it depends on whether you can put together a project of that scale within these limitations. Does it make more sense to do that or does it make sense, for example, to cut out some smaller piece of it to get you to a proof of concept stage? These are all things you can think about in determining the appropriate scale. The other thing you could do is wait until an opportunity for larger projects comes about. If that is really the thing that makes the most sense, then you should probably do that.

If a set of PIs are identified in the Letter of Intent but the investigator team would like to add PIs for the full proposal, is that acceptable?

You can make minor changes from the Letter of Intent. If you have a Letter of Intent, that is your reservation. As the proposal develops, if you need to develop it a different way, or if you decide you are going to change the emphasis of it or change the team a little, you can do that.

We have a question about overlap with Biomedical Engineering (BME) and how to arbitrate between those two programs when deciding where to apply.

I would just go back to the way that the Neuroengineering and Brain-Inspired Concepts and Designs theme is worded. BME has specific interests and a specific set of disciplinary conventions. This would be expected to integrate beyond the approaches that are typical in a bioengineering program and potentially to go to higher risk sorts of targets.

We have a couple of questions about international collaboration. One is whether you do the CORE+ EXTENSION as an international collaboration, and the other is can an investigator serve as one of the multiple investigators in a proposal.

Yes, you can use the CORE+ EXTENSION to add an international dimension to the project as long as adding that international dimension is also adding the kind of synergy that is expected for this solicitation. The funding for the CORE+ EXTENSION case of international supplements is directed towards the US side of an international collaboration. I just want to make sure that is clear. If you have a collaboration with somebody in another country, the additional money can be used for travel, for example to give your students and PIs extended periods of time to do research in a foreign lab, but the foreign partner is expected to support their own part of the project. That said, intellectually a foreign PI could certainly be a part of the intellectual substance in the collaborative requirement for a program like this. You should take a look in the Grant Proposal Guide for details on how to document an unfunded collaboration. Substantively, it will count towards the collaborative integrative aspects of the program.

Can you address how the inclusion of pilot data would relate to the expectation that the proposal should be high risk, high reward?

Even in a high risk, high reward sort of proposal, it is important to make some sort of substantive case that there is something that is feasible that can be done here, but it doesn't necessarily have to be a case that is made with pilot data. In many cases, when you are doing something really new and unprecedented, you might not have very much pilot data to really make that kind of case. I think the important thing here is to think about your feasibility case in more general terms. It is not necessarily just that you've shown that you can do it. It might be that you have outlined something in principle that really makes sense as a way to go. Pilot data can certainly be a part of making your feasibility case, but it is not the only way to do that, and it's not some sort of a blanket expectation or requirement.

Is it appropriate or acceptable for a project to combine qualitative and quantitative approaches?

Certainly.

This is more basic question that I think probably we can refer to the NSF website. What is the difference between CISE and Engineering (ENG)?

There is an intersection between Computer & Information Science & Engineering (CISE) and the division of Engineering that is called Electrical, Communications and Cyber Systems (ECCS), but then there are also areas of computer science that are quite different from the engineering issues and, similarly, aspects of engineering that don't concern computers. I'm not sure if I need to say more about that. You can certainly take a look at the kinds of things funded by each Directorate to get a better sense of that.

I think the answer to this one is probably "It depends", but just on general principles, I'll ask. Can an integration of existing technologies in a more advanced way to address the research theme be considered innovative?

I think you're right that this depends. Certainly if you have some quite new ideas about using some kinds of existing technologies, you could make the case for that.

Do you have any advice for how to negotiate the potential overlap between this solicitation and other BRAIN Initiative funding, through NIH for example?

The overlap, if there is overlap between two solicitations that NSF and NIH issue, may be regulated in that there is no more than one opportunity that you can ultimately apply to. In thinking about overlap between this and other NSF programs, you need to think very carefully about which one is the best opportunity for you. In general, there are differences in mission between NSF and NIH, but we do see in the brain and cognitive science area that we do have a lot of core scientific interests that are of interest to both agencies.

With respect to crossing scales in the proposal, is there a need to cross all scales or just a few?

That is a good question. First of all, crossing scales is just one of several types of boundary crossing that we're looking for here, and whether it is crossing scales or many, it really depends on the nature of the questions that you're trying to ask and what you're trying to accomplish. I wouldn't say there is a set requirement that it has to cross N scales.

When addressing why the proposal is not suitable for the existing core programs, should we detail specific other core programs that might be relevant and provide an answer for each one on why it is not relevant?

Actually your space on the Letter of Intent will probably be too limited to go into that much detail, but if you could briefly hit the high points of what makes it unsuitable for the core programs, that would be enough.

I see some questions about the specific nature of the Individuality and Variation theme. Is the theme referring specifically to across-individual normal and abnormal variability?

It could be biological variability and could be behavioral variability. It could be variability in the statistical aspects of underlying processes and signals. We really see that as a theme that does cut across all levels of the system and that is quite compelling in terms of current integrative interest.

This is a more general eligibility question. Can a person who is expecting a PhD in May 2015 be a PI or co-PI?

That would be quite unlikely, but let me say that the issue of who can be a PI or co-PI is not actually an issue for us at NSF. It is an issue for your institution. If someone is a PI or co-PI on an application for Federal funding, the institution is saying that this person has standing to represent the institution in that application for federal funds. These types of things are up to your institution rules. Typically, someone with student status would hardly ever be eligible.

I think that we're pretty much caught up on all the general questions. We have referred people who posted more specific questions about their research to the solicitation. You should be getting an email back, but if there are any other questions, you can post them in the Q&A section on the webinar or you can send an email.

We have another question about clarifying what it means to cross scales. I think we have addressed that but if you want to add anything...

I do not really have any more to say on that. If there is a specific question, feel free to ask us in more detail or just call us about it.

Thank you very much for tuning into this webinar. We're really looking forward to receiving your Letters of Intent next week and your proposals in January. If any issues come up, feel free to use the NCS email. That is a good place to reach us because it is always monitored. If you have questions coming up in the next week or the next month as you are preparing your proposals, please let us know and we will do our best to clarify any issues or questions. Thank you very much.

This concludes today's conference. All participants may disconnect at this time. Thank you.